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NEWSLETTER NOTES

Joe A. McCarty, P.E. (202) 761-8619

This is our last newsletter prior to the E&M conference in Kansas City. If you have not yet made your reservations with Kansas City District, you best do so now or you may have to pay above per diem rate for your room. It should be another outstanding conference with the exchange of a lot of good information. I am looking forward to the conference and hope to see you there.

There are a lot of good ideas in this issue including POL, fire and life safety concerns and energy conservation. Since we have recently reduced the design energy targets in the AEI by 10 percent, energy conservation should be receiving more attention during the design process. If you cannot meet the target on a specific project, the divisions can provide a waiver but it is very important that the information requested in the 2 December 1997 memorandum be provided to HQ so we can better evaluate the impact of this criteria change. Many of you are also involved in an effort with CERL to develop new design energy targets based on present technologies and design practices.

I was fortunate to attend an American Consulting Engineers Council conference last week. The owners and senior management of these firms have a concern with quality facilities and meeting the needs and expectations of the customers. There was real interest in what the Corps is doing with ISO 9000 certification, quality assurance processes and building and system commissioning. Another hot topic is design-build. A number of attendees was very interested in the Internet address for our draft AEI, Design Build Technical Requirements. Others were already familiar with the document and were generally very complimentary of its contents and basic approach. They thought it would receive a lot of use in preparing RFP not just in the Corps but throughout the Federal and Local Government sector as well as in the private sector. It is apparently the only or one of the only design-build guidance

documents that addresses technical requirements in a clear and effective manner. Give us your feedback on this document so we can improve it and have it meet your needs.

POL SYSTEMS

Dale Otterness, P.E. (202) 761-8621

Design Manual: In a previous issue of the newsletter it was announced that the military handbook was complete and available on the Internet from Navy's website. The access through the Navy website is not as user friendly as we would like, so we have now included it in the Corps TECHINFO website. The specific internet address is <http://www.hnd.usace.army.mil/techinfo/misc/mh1022.pdf>. You can also go to the main TECHINFO webpage, <http://www.hnd.usace.army.mil/techinfo>, and click on the "Military Handbooks" link which will bring up a listing of all military handbooks available on TECHINFO. In either case, you will need to use "adobe acrobat" to read the handbook.

Underground Fuel Storage Tanks:

A change notice to CEGS 13202, Fuel Storage System has recently been approved. The revision includes clarification of the requirements for concrete slabs under buried fuel storage tanks and adds requirements for provide a filter fabric material in the tank excavation to keep undisturbed soil from displacing new backfill material in high water tables.

DESICCANT COOLING

GUIDE SPECIFICATION

Timothy Gordon, P.E. (202) 761-1773

A new guide specification, CEGS 15500, Desiccant Cooling Systems, developed by the Mobile District is now on TECHINFO, <http://www.hnd.usace.army.mil/techinfo>. This effort resulted from a very thorough survey of the industry to incorporate the latest in desiccant technology.

There are an increasing number of applications where desiccants can be utilized especially in humid areas, laboratories, indoor swimming pools and kitchen areas. Desiccant cooling is especially attractive since reheat is not required as with other dehumidification processes.

Corps and DPW HVAC designers should bear in mind that this guide specification is brand new and is very much an active on-going effort. During the design and construction phases many "lessons learned" may be developed from the applications of desiccant cooling. Improvements will be made to the specification when input from the field is provided to HQUSACE through Engr. Form 3078 or other feedback systems.

ENERGY SAVINGS FOR FAMILY HOUSING

Timothy Gordon, P.E. (202) 761-1773

To demonstrate energy efficient family housing, the U.S. Army in a joint effort with the Office of the Secretary of Defense (OSD) and the Environmental Protection Administration (EPA) set out to construct the most energy efficient and cost-effective Army family housing possible with the greatest payback and the highest return on investment.

Energy saving methods equal to or better than the EPA's Energy Star requirements (EPA's highest energy standard for homes) were assembled and written into an RFP for military housing at Fort Lee. Features included: natural gas furnaces with an AFUE of > 90 percent; air conditioning systems with a seasonal efficiency factor (SEER) of 12.0; minimum opaque walls with an insulation value of R-22.6; R-41 in the ceilings; low infiltration windows; low energy consumption dishwasher; house wrapping to reduce infiltration; high energy efficient water heater; circulation fans and ductwork within the conditioned spaces. An EPA and Corps analysis of the RFP concluded with the cost savings in energy the "net present value for a 25 year life is approximately \$1,456,979" for the 135 units of housing. It is now clear that the extra cost of making military housing more energy efficient is also cost effective.

A blower door test was performed to measure air infiltration of these housing structures. The 0.20 air changes per hour was not achieved during the initial test. Adjustments were made to better seal ductwork penetrations into the space and at door entrances. After additional sealing was provided, the goal of 0.20 was attained.

A question arose regarding tighter construction and adequate ventilation. Current infiltration allowances in terms of air changes per hour (ACH) of the Family Housing AEI are high enough to provide adequate outside air for the occupants. The housing units at Fort Lee utilized ducted outside air to the air handling unit. This ventilation air was then mixed with return air and distributed throughout the house. Sufficient outside air was provided for normal occupancy. When a larger group of people assemble in a residence, the occupants had, within easy reach at the thermostat, the option of switching to high ventilation mode. In theory indoor air

quality will be maintained.

The net present value was calculated considering that a homeowner would occupy these units. Since the occupant would pay the utility bills, the air handling unit fan would function in its correct speed depending on occupancy. Controlling the fan in this manner would be the most advantageous in terms of energy savings. Military occupants of these units do not pay the utility bills. Even with instruction on how to properly operate the air handling unit fan, energy savings or adequate indoor air quality may not be consistently realized. The fan speed may often be in the incorrect setting resulting in either reduced energy savings or inadequate ventilation when the occupancy level is above normal.

In conclusion, adoption of forced ventilation in conjunction with "tighter construction" rather than relying on infiltration for ventilation is not recommended at this time. Other improvements to military housing construction such as higher efficiency furnaces and air conditioning systems, higher "R" values and others mentioned above with the exception of house wrapping to reduce infiltration are cost effective and will be implemented into the AEI for Family Housing.

OMEGA SPRINKLERS

Robert DiAngelo, P.E. (202) 761-4803

Omega sprinklers manufactured by the Central Sprinkler Corporation have frequently been in the news lately. Most recently the U.S. Consumer Products Safety Commission (CPSC) announced in March that it has filed a complaint against Central Sprinkler Corporation, alleging that Central's Omega series fire sprinklers present a substantial product hazard. The complaint

seeks a nationwide recall of approximately 10 million Omega fire sprinklers that Central has manufactured since 1982. In its complaint, the CPSC alleges that these sprinklers are defective and are likely to fail in a fire situation. The sprinklers may not properly activate in the event of a fire, thus exposing the public to bodily injury or death. CPSC claims to be aware of six fires in which the Omega fire sprinklers reportedly failed to operate. In one of these instances, the fire supposedly caused more than \$3 million in property damage.

Central attributes the problem with the sprinkler heads to the EPDM internal o-ring which seals the cap to the sprinkler body. Central is claiming that the cause of the failures is site related and not the fault of the manufacturer. There has not been a recall of the product as of this date. Central claims that the reason for the non-activation is stop-leak products contained within the sprinkler piping. Stop-leak additions have been prohibited by code for many years. As a result of Central's further investigations, a second condition was discovered that can cause the Omega sprinkler to fail and that is the presence of high concentrations of cutting oils in steel piping. The EPDM o-ring swells and this causes an increase in the pressure required to activate the sprinkler.

Central claims to have solved the problem by changing the EPDM o-ring to a silicon rubber o-ring. All Omega sprinklers manufactured after 7 June 1996 are equipped with the silicon o-ring. For installation of existing Omega sprinklers with EPDM o-rings, Central has instituted a procedure for doing sample testing of sprinklers. This procedure is detailed in EIRS Bulletin 97-07. Basically if there is a potential problem, e.g. pressure higher than system pressure is needed to open the sprinkler, arrangements will be made between the Central Sprinkler Company and the user to replace sprinkler heads. If the problem was caused by stop-

leak additive, Central will provide replacement sprinklers at a reduced cost. If the problem is caused by absorption of cutting oils by the EPDM o-ring, Central will assist with replacement of all sprinkler heads at its own expense.

Omega heads can be identified by three external thin metal disks that are 1/2-inch in diameter. They are the quick response type or residential type of sprinkler. They can be pendent or sidewall type. Omega style sprinklers are also the flow control or on/off sprinklers. Catalog cuts of the sprinkler are attached in the EIRS Bulletin 97-07. If there are any questions on Central Sprinkler Company's procedures, contact Mr. Kip Bilo or Mr. Andy Post at (800) 523-6512.

We recently issued a notice change to our sprinkler guide specifications, CEGS 13930, 13935 and 13945, to prohibit sprinklers that utilize an internal o-ring. Because of the problems associated with the Omega sprinklers which utilizes the o-ring design, we feel that at this time it is best to avoid these type sprinklers. There is an adequate choice of sprinklers that don't utilize an o-ring design and that meets our customer's needs.

VENTILATION FOR FLAMMABLE LIQUIDS STORAGE

Robert DiAngelo, P.E. (202) 761-4803

EIRS Bulletin 98-01 has recently been issued. It includes revised ventilation requirements for flammable liquid and hazmat storage facilities, as well as for hazardous waste storage facilities. The new requirement reduces the required exhaust venting by approximately two-thirds and allows air recirculation, if the space is equipped with LEL detectors and classified electrical. Prior to this bulletin, 6 air

changes per hour was being provided. The 6 air changes per hour exceeded the most conservative venting requirement for storage facilities. The new guidelines are based on Factory Mutual ventilation requirements, 0.15 cu m/min/sq m (0.5 cfm/sq ft) of floor area. Make-up air outlet and exhaust inlet openings will be within 0.3 m (12 in.) of the floor and arranged so that the air sweeps across the floor areas. This new criteria will result in significant energy savings for these facilities.

CLOTHES DRYER EXHAUST VENTING

Robert DiAngelo, P.E. (202) 761-4803

ETL 1110-3-483, Clothes Dryer Exhaust Venting, which was developed by our Savannah District, has been approved and is available on the TECHINFO web site. This document provides much needed design guidance for exhaust venting of electric and gas-fired clothes dryers. There is very little design information on these systems, especially for dryers with lengthy runs of exhaust duct or with exhaust vents manifolded together. Without an adequate and maintainable venting system, clothes dryers can experience excessive lint build-up and present a serious fire hazard.

BREAK-AWAY PARTITIONS

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TRADOC was considering providing break-away (knock-down) partitions for separating male and female soldiers in integrated barracks. They have several existing installations. These partitions which are

located in the exit corridors were to be constructed of 1/4-inch plywood on wood studs and provided with instructions for their removal or knock-down. We recommended that break-away partitions not be used: (1) they are a violation of NFPA 101, *Life Safety Code*; (2) persons not familiar with the break-away barriers would not know that the wall was a break-away barrier wall; (3) Persons in an exit corridor filled with toxic smoke and hot gases can not be expected to make complex decisions such as negotiating a break-down wall. Detailed instructions could not be read and comprehended by occupants in a state of panic, in a smoke filled corridor; and (4) once the wall was down, it would impede egress, especially if corridor was filled with smoke, and visibility was poor. We recommended a permanent partition with door(s) equipped with special locks that comply with NFPA 101, *Life Safety Code*. One of the features of these special locks is that they release when the building fire alarm system is activated. TRADOC has agreed to not install the partitions and to modify existing installations by making the partition permanent and providing an exit door.

HEAT DISTRIBUTION SYSTEMS

Dale Otterness, P.E. (202) 761-8621

Guide specification for Pre-Engineered Underground Heat Distribution Systems - An interim version of a new specification eliminating prequalification for these systems was made available on TECHINFO web page last fall in nonstandard format as CEGS 02695. In the meantime we have been feverishly preparing a better version in normal format with wholesale improvements including important changes to the thermal performance testing. The specification now requires one-time thermocouple readings a few weeks after start-up as opposed to the

original version of intermittent testing over many years. This version is now available on TECHINFO and the new specification number is CEGS 02552.

PLUMBING

Dale Otterness, P.E. (202) 761-8621

ETL 1110-3-489, Domestic Water Heaters for Barracks has been prepared by the Savannah District and contains design criteria for properly sizing water heaters for barracks. Use of the criteria in the ETL will ensure that sufficient hot water is available for the troops living in Army barracks. The ETL is available on the TECHINFO web site at <http://www.usace.army.mil/inet/usace-docs/eng-tech-ltrs/etl1110-3-489/toc.html>.

Plumbing Specifications: Change notices to CEGS 15400, Plumbing, General Purpose and CEGS 15405, Plumbing, Hospital have recently been approved. The changes clarified requirements for hubless cast iron soil pipe, the selection of type of water heaters, the prohibition of plastic pipe in air plenums, hanger and support details and disinfection, flushing and testing details.